Work Order ID  November-30-11 2:55:20			*772	268*						Page 1
Revision ID:	4-203TRN  Turning Detail	St. A	Accept	*N900	<u>040</u>	100	)*	Setup Sta	I VI	S1* S2*
<b>Start Date:</b> 30/11/20 <b>Required Date:</b> 14/12/20		*1* *1*	)	Cust Item I Customer:	D:					
Reference:		<u></u>			*	÷				افر ا
Approvals: Process QC:	Plan: M.L.J	Date: 11   11   3			ate:		ı	Run Sta Sto	" <b>  \</b>	R1* R2*
Sequence ID/ Work Center ID	Operation Description	-	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr.	_				<del>-}</del>				
D412-664-243	Rev E(DEO)				•					•
¹00 <b>★1∩∩</b> *	MORI SEIKI CNC LATI	HE LARGE	0.00		56/R		1			
Mori Seiki	Memo		0.00	١	The late				·	
Mori Seiki CNC Lathe Large	2-Turn first:	ith sand & install plugs D'side as per Folio FA166 tion lines smooth.	Γ8534 on both ends as pe	er Folio FA166					-	
110	QC1- Inspect dimensions	to dimension sheet	0.00	÷(1	12/02/11			an a		
*110* QC Quality Control	Memo		0.00	<b>\$</b> 6-	17/02/11	:	<u> </u>		<u></u>	

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DATE	STEP	Description of NC Section A	Initial Action Description Chief Eng Chief Eng		Sign &	Verific Secti	cation on C	Approval Chief Eng	Approval QC Inspector
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Work Order ID 77268 \*77268\* Page 2 November-30-11 2:55:20 PM D412-664-203TRN Item ID: Accept \*N900040100\* Setup Start **Revision ID:** Stop Item Name: Crosstube Turning Detail 30/11/2011 Start Qty: 1.00 **Start Date:** Cust Item ID: **Required Date:** 14/12/2011 Req'd Qty: 1.00 **Customer:** Reference: Run Start Process Plan: \_\_\_\_\_ Date: \_\_\_\_ **Approvals:** Tooling: Date: Stop Date: SPC (Y/N): Date: Operation Sequence ID/ Tool ID Tool # Plan Reject Set Up/ Accept Reject Insp. **Work Center ID** Qty Description **Run Hours** Code Oty Number Stamp 120 0.00 MORI SEIKI CNC LATHE LARGE Re/EL relaction 1 \*120\* Mori Seiki 0.00 Memo Mori Seiki CNC Lathe Large 1-Turn second side as per Folio FA166 2- File transition lines smooth. 3- Remove sand and plugs 4-Scribe part # and batch # using vibrating stilus FOLIO REV: DWG REV: 130 QC1- Inspect dimensions to dimension sheet 0.00 28/36 izlozliz 1 \_\_\_\_\_ \*120\* QC 0.00 Memo Quality Control 140 QC8- Inspect parts - second check B.A 12/02/12 0.00 \*140\* QC 0.00 Memo

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**Quality Control** 

## **Dart Aerospace Ltd**

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Work Order ID 77268 \*77268\* Page 3 November-30-11 2:55:20 PM Item ID: D412-664-203TRN Accept \*N900040100\* Setup Start **Revision ID:** Item Name: Crosstube Turning Detail **Start Date:** Start Qty: 1.00 30/11/2011 **Cust Item ID:** Req'd Qty: 1.00 **Required Date:** 14/12/2011 **Customer:** Reference: Run Start Process Plan: \_\_\_\_ Date: \_\_\_\_ Tooling: Approvals: Date: Stop Date:\_\_\_\_\_ SPC (Y/N): Date: Sequence ID/ Operation Tool # Plan Reject Tool ID Set Up/ Accept Reject Insp. **Work Center ID** Description Code Qty Qty Number Stamp **Run Hours** 145 0.00 \*145\* 12-2-12 Crosstubes 0.00 Memo Crosstubes GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY. 12-2-11 150 Crosstubes Chemical Conversion 0.00 \*150\* HandFXtube 0.00 Memo Hand Finishing Crosstubes 3- Inspect Part Finish 160 \*16በ\* QC Memo

Quality Control

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Work Order ID 77268 \*77268\* Page 4 November-30-11 2:55:20 PM D412-664-203TRN Item ID: Accept \*N900040100\* Setup Start **Revision ID:** Item Name: Crosstube Turning Detail **Start Date:** 30/11/2011 Start Qty: 1.00 **Cust Item ID: Required Date: 14/12/2011** Req'd Qty: 1.00 **Customer:** Reference: Run Start Date: Approvals: Process Plan: **Tooling:** Date: Stop Date: SPC (Y/N): Date: Sequence ID/ Operation Tool ID Tool # Plan Set Up/ Reject Accept Reject Insp. **Work Center ID Description Run Hours** Qty Qty Number Stamp Code 170 0.00 12-2-17 Packaging \*170\* Packaging 0.00 Memo Identify and stock in kanban rack Packaging Location:  $\angle G$ 180 QC21- Final Inspection - Work Order Release 0.00 \*120\* QC 0.00 Memo Quality Control

pp-02-13

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### **Picklist Print**

November-30-11 2:55:24 PM

Work Order ID: 77268

\*77268\*

Parent Item: D412-664-203TRN

Parent Item Name: Crosstube Turning Detail

\*D412-664-203TRN\*

Start Date: 30/11/2011

**Required Date: 14/12/2011** 

Page 1

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A 08-03-06 new issue DD verified by:eec IPP Rev B 08.04.02 Removed polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	<u>.</u>	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6009-129	,	Manufactured	No			120	Each	4.0000	1	1			
*D6000 11	2O*								**				

176009-179

Crosstube Material

Location Loc Oty Loc Code LG 65179

The worker

## **Dart Aerospace Ltd**

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DART AEROSPACE LTD	Work Order:	77768
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: E		Page 1 of 1

# FIRST ARTICLE INSPECTION CHECKLIST

X First Article Prototype

	spection Sheet wing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
	2.684	+0.005/-0.000	7.688	1/11		Tage/calper	8409 18606
	2.748	+0.005/-0.000	7.752	1		/carpur	VP C-1 1 00 0 0
	2.884	+0.005/-0.000	7.888				
	3.019	+0.005/-0.000	3.023	/			
	3.163	+0.005/-0.000	3.167	~			
	3.308	+0.005/-0.000	3,313	/			
A	3.429	+0.005/-0.000	2.43	<i>i</i> -			
SIDE	2.990	+0.005/-0.000	7.993	~			
S	2.618	+0.005/-0.000	2.622	~			
	0.200	+/-0.010	. 1 (2( )				
	R0.063	+/-0.010	-067				<del></del>
	R0.500	+/-0.010	.500	)			
	4.971	+/-0.030	4.971	~		_	
	2.684	+0.005/-0.000	7.688	7			
	2.748	+0.005/-0.000	7.752	7			
	2.884	+0.005/-0.000	7-888	~			
	3.019	+0.005/-0.000	3.023	~			
	3.163	+0.005/-0.000	3164	~			
	3.308	+0.005/-0.000	3.310				
æ	3.429	+0.005/-0.000	3.4129				
SIDE	2.990	+0.005/-0.000	7.993	~			
S	2.618	+0.005/-0.000	2622	_			
	0.200	+/-0.010	.200				
.	R0.063	+/-0.010	-063				
	R0.500	+/-0.010	.500				
	4.971	+/-0.030	4-971			-	
	124.100	+/-0.020	124.1			Tage	TS6 09

Measured by:	986	Audited by:	J-0	Prototype Approval:	N/A
Date:	relorlia	Date:	12/02/12	Date:	N/A

Rev	Date	Change	Revised by	Approved
Α	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	фрити
В	06.03.09	Dwg Rev updated	KJ/JLM	
С	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	
D	10.02.02	Dimension 124.100 was 124.09	KJ KD	<del>- N/</del>

## **Dart Aerospace Ltd**

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Part No: \_\_\_\_\_\_ PAR #: \_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_ Date: \_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_

	Resolution:		_ Dispositio	n:	QA: N/C Clos	sed:	Date:	
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NOTE: Date & initial all entries

item	Qty -243	Part Number	Description
- 2-			
1	. X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	• 1	D6009-129	CROSSTUBE
3	* 2	D3595-063-570	RUBBER CUSHION
4	. 1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2.	D2856-600-1009	ABRASION STRIP
	<u>~~;</u>		
7	રે4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9.	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

#### **GENERAL NOTES:**

1) MATERIAL: MANUFACTURED FROM D6009-129

FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2

3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

- ) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MACNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL ORIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP

RETURN
ENGINE
ENGINE
UNCONTROL
SUBJECT TO AND MARKE
WITHOUT
WORK CHANGE
NO. 37208 M. C. J

@ DEO ATTACHED

DELEASED 2009 -10- 29

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E	TO CUE PAR 08 C8-3 &	SANIZED VIEWS RRENT STAND -046 (ZN A6-3);	ENERAL NOTES; SAND REFORMATTED DRAWING ARDS; RELOCATED FLAG #6 PER ADD TOLERANCE (ZN B6-3, C4-3, TURNING DETAIL & UPDATED ET 4.	, RF	09.09.30		
D	REMO	VE D2732-058.	PH	07.03.09			
С		VE D2856-600- OBOND 6398,	мв	06.10.27			
В	ADD H		MPATABILITY WITH BHT/AA	РН	05.02.04		
A	NEW IS	SSUE		PH	01.10.17		
REV.			DESCRIPTION	BY	DATE		
DESIGN A		PH	DART AEROSPACE LTD				

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## **Dart Aerospace Ltd**

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12 13 16 D2896-1 SUPPORT D3595-063-570 RUBBER CUSHION, 2X MS21920-30 CLAMP, 2X 14 16 D2856-600-1009 ABRASION STRIP —
D3189-1 CHAFING SHIELD (1. INSTALLED OVER ABRASION STRIP)
MS21920-28 CLAMP, 2X
2 PL D D412-664-603 BENT TUBE D3189-1 REF SYM D212-664-243 ASSEMBLY DETAIL 12 APPLY MAGNOBOND BETWEEN D2896-1 AND THE CROSSTUBE ② DEÖ ATTACHED D2896-1 SUPPORT REF 16 MS21920-28 CLAMP D3595-063-570 RUBBER CUSHION -UNDER CLAMP, REF 13 16 DESIGN DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA PH RF MS21920-30 CLAMP, REF SECTION A-A C6-2 DRAWN CHECKED DRAWING NO. REV. E MFG. APPR. D412-664-243 SHEET 2 OF 4 SECTION B-B D4-2 APPROVED TITLE SCALE 4X

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CROSSTUBE ASSEMBLY (412 HI AFT) NTS

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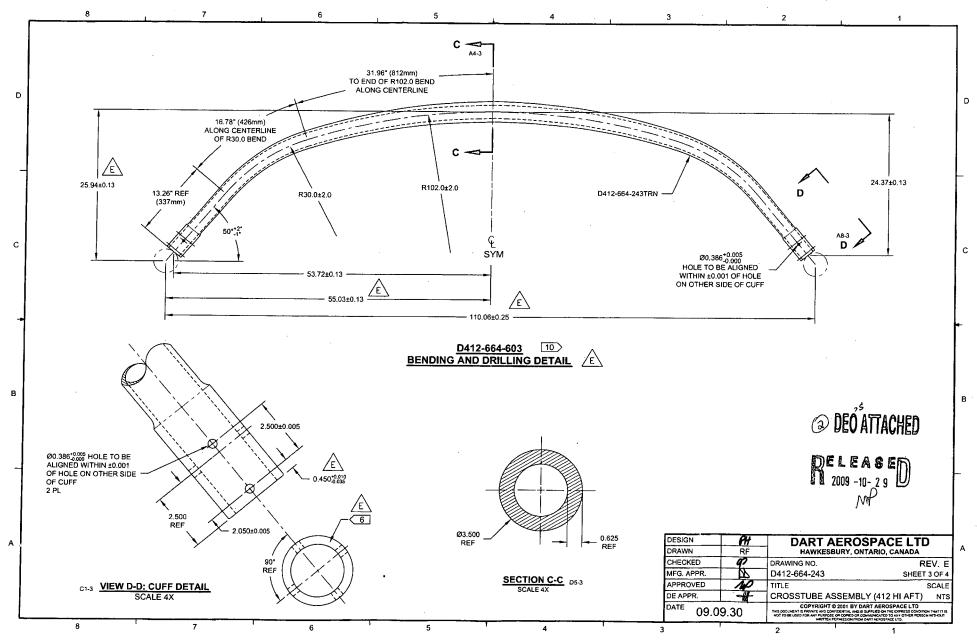
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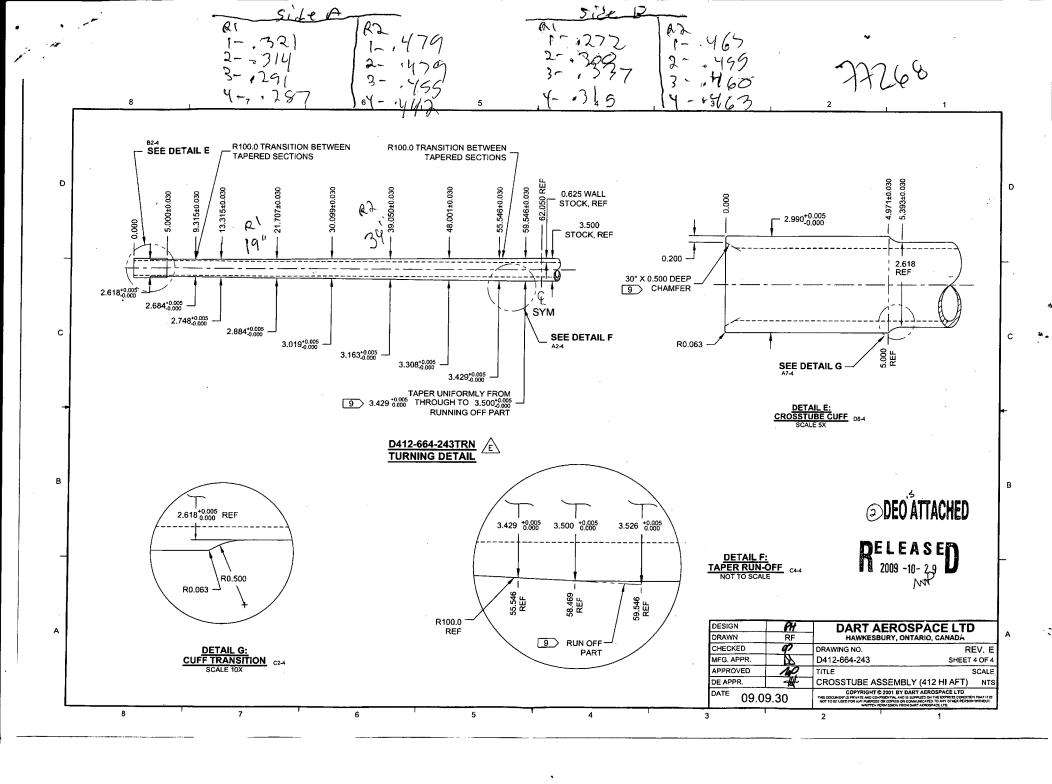
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DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEM		<b>ENGINEERING ORDER</b>	D412-664-243-E-1	SHEET 1 OF 2	NTS
DRAWN	CHECKED	M	MFG. APPR.	APPROVED MAP	DE APPR.	
DATE 11.03	3.31 DATE	11/03.31	DATE //.03.31	DATE 11/03·3)	DATE /1.03.31	

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

#### **CHANGE:**

#### PARTS LIST IS AMENDED AS FOLLOWS:

#### <u>IS:</u>

item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

#### WAS:

6	2	D2856-600-1009	ABRASION STRIP

### NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

<u>IS:</u>

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2

AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

### WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
  PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
  PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.



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Resolution:			Disposition: QA			osed:		Date: _	·
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DATE	STEP	Description of NC					ication Approval		Approval
	O.L.	Section A	Initial Chief Eng	Action Description Chief Eng	Date	Secti	ion C	Chief Eng	QC Inspector
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DRAWING NO.	TITLE		REV. E	DART AEROSPACE I		).	SHEET NO.	SCALE
D412-664-24	13   CROSSTU		BLY (412 HI AFT)	ENGINEERING ORD	<b>ER</b> D412-66	64-243 <b>-</b> Ę-1	SHEET 2 OF 2	NTS
DRAWN	<u></u>	CHECKED	MA	MFG. APPR.	APPROVED	M	DE APPR.	······································
DATE 1	1.03.31	DATE	11.03.31	DATE (1-03-51	DATE	11.03.31	DATE 11.03.31	
<u>IS:</u>		A PRIOR TO PAIL AR COAT AFTER	920-28 CLAMP, 2X 2 PL	D412-664-243 ASSEMBLY DETAIL	D2 D3	21920-28 CLAMP, 2X	ELD (1, INSTALLED OVER ABRASI	ON STRIP)
<b>O</b>	2.00			C SYM				Θ
	<del>-</del>			·		THIS DOCUMENT IS PRIVATE NOT TO BE USED FOR ANY	RIGHT © 2011 BY DART AEROSPACE L AND CONFIDENTIA. AND IS SUPPLIED ON THE EXPRESS IN PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER WRITTEN PERMISSION FROM DART AEROSPACE LTD.	TD CONDITION THAT IT IS R PERSON WITHOUT

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W/O:			WORK ORDER CHANGES Approval									
DATE	STEP	PRO	OCEDURE CHAI	Ву	Date	Qty	Chief Eng / Prod Mgr	Approval QC Inspector				
Part No	•	PAR #:	Fault Cate	gory:	_ NCR: Ye	es No C	QA:	Date:				
Resoluti		esolution:	Disposition	1:	QA: N/C	Closed:		Date: _				
NCR:		\	WORK ORDER NON-CONFORMANCE (NCR)									
DATE	CTED	Description of NC			tion B	Ver	rification	Approval	Approval			
DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng		Section C		Chief Eng	QC Inspector			
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DRAWING NO.	TITLE		REV. E	DART AEROSPACE LT	D c	).E.O. NO.	SHEET NO.	SCALE
D412-664-24	3 CROSSTU	BE ASS'Y (4	12 HI AFT)	ENGINEERING ORDE	R [	0412-664-243-E-2	SHEET 1 OF	1 NTS
DRAWN	P	CHECKED	ASS	MFG. APPR.	APPF	ROVED MP	DE APPR.	
DATE 11	1.09.07	DATE	11.09.19	DATE ((.01.19	DATE		DATE //. 90	1.19

**PURPOSE:** 

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

#### **CHANGE:**

Item	Qty -243	Part Number	Description
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD.

#### WAS:

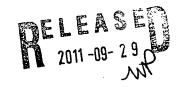
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II. CLASS 2 ADHESIVE)

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

#### WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



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W/O:			V	VORK ORE	ER CHANG	ES					
DATE	STEP	PROC	CEDURE CH	IANGE			Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
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Part No		PAR #:	_ Fault Ca	the state of the s		_ NCR	: Yes N	o DQA	\:	Date:	
	R	esolution:	_ Disposit	ion:		_ QA:	N/C Clos	sed:	س	Date: _	
NCR:		W	ORK OR	DER NON-	CONFORMA	ANCE	(NCR)	<del>*************************************</del>	<del>**</del>		•
DATE	STEP	Description of NC	Corrective Action Section B			on B	0: 0	1 Section S		Approval	Approval
DAIL	SIEP	Section A	Initial Action Description Chief Eng Chief Eng				Sign & Date			Chief Eng	QC Inspector
·				·			<i>3.</i> 4			-	<b>*</b>

NCR:	•	· VV	ORK OR	DER NON-CONFORMANCI	= (NCR)			• • • • • • • • • • • • • • • • • • •
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification	Approval	Approval
			Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Chief Eng	QC Inspector
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